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43. (Amended) The further PH5HK-derived maize plants, or parts thereof, produced by the method of claim 42.

48. (Amended) The single gene conversion maize plant of claim 47, wherein the gene is a dominant allele.

49. (Amended) The single gene conversion maize plant of claim 47, wherein the gene is a recessive allele.

#### REMARKS

In the Office Action dated March 26, 2002 the Examiner states that "Claims 1, 6, 21, 25, 37, and 40 are objected to for their inclusion of blanks '\_\_\_\_\_'. It is assumed that the blanks will be replaced by the ATCC deposit accession number." Claims 1, 6, 21, 25, 37, and 40 have been so amended by deleting the blank spaces and inserting the ATCC deposit number. The specification has also been amended to include the terms of the deposit for PH5HK. A copy of the ATCC deposit receipt is included in this response. These actions obviate the objection and place claims 1, 6, 21, 25, 37, and 40 in condition for allowance.

The Examiner states that, "Claims 3 and 22 are indefinite in their recitation of 'wherein the plant is male sterile' .... Replacement of the phrase with --further comprising a genetic factor conferring male sterility-- would obviate this rejection." Claims 3 and 22 have been so amended and thus claims 3 and 22 are now in condition for allowance.

The Examiner states that, "Claims 5 and 24 are indefinite in their recitation of the 'the...protoplasts' which lacks antecedent basis in the claims from which they depend. Deletion of 'the' before 'cells' in line 1, and insertion of --of the tissue culture-- after 'protoplasts' in line 1, would obviate this rejection." Claims 5 and 24 have been amended as suggested and are now in condition for allowance.

The Examiner states that, "Claims 14, 33, 41, 45 and 46 are indefinite in their recitation of 'good', 'high', 'above average', 'strong', 'large' and 'adapted' which are unduly narrative and so fail to clearly characterize the degree of expression of the claimed trait or the claimed maize plant exhibiting the trait." Claims 14 and 41 have

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been amended and no longer include such terms as "good", "high", "above average", "strong", "large", and "adapted". Claims 33, 45, and 46 have been cancelled.

The Examiner states that, "Claims 16 and 35 are indefinite in their recitation of '[t]he maize plant breeding program' since the claims from which they depend are drawn to methods rather than breeding programs. Replacement of the phrase with '[t]he method' would obviate this rejection." Claims 16 and 35 has been so amended and therefore are in condition for allowance.

The Examiner states that, "Claims 19-20 and 48-49 are indefinite in their recitation of '[t]he single gene conversion(s) of claim' since the preceding claims are drawn to maize plants rather than single gene conversions. Replacement of 'conversion(s)' with --conversion--, and insertion of --maize plant -- after 'conversion', would obviate this rejection." Claims 19-20 and 48-49 have been amended as suggested by the Examiner and therefore the claims are in condition for allowance.

The Examiner states that, "Claims 14, 33, 43, and 45-46 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Cummings et al (U.S. 5,977,455)." The Examiner goes on to state, "The claims are drawn to maize plants exhibiting two traits and which are derived from the exemplified maize inbred following an unspecified number of crosses for an unspecified number of generations with other plants of unspecified genetic complements, wherein at least one parent was the exemplified maize plant." Claims 33, 45, and 46 have been cancelled. Claims 14, 42, and 43 have been amended, and now each claim clearly has a limit on the number of crosses away from PH5HK. Claim 14 has been amended and now reads, "An inbred maize plant, or parts thereof, wherein said inbred maize plant was developed by a cross of the maize plant of claim 2 with a second maize plant, growing a progeny seed obtained from said cross, and repeating the steps of selfing and growing each subsequent generation to obtain said inbred maize plant." Claim 14 is limited to an inbred maize plant one cross away from PH5HK. Support for this amendment can be found in the specification, for example, on page 3, line 31 through page 4, line 5. Claim 42 has been amended to read, "The method of claim 40, further comprising: (c) crossing said PH5HK-derived maize plant with itself to yield additional PH5HK-derived progeny maize seed; (d) growing said progeny maize seed of step (c) under plant growth conditions, to yield additional PH5HK-derived maize plants; (e) repeating the crossing and growing steps of (c) and (d) to generate further PH5HK-derived maize plants." Claim 43 now through dependency is limited to one cross away from PH5HK. For

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clarification, claim 43 has been amended to read, "The further PH5HK-derived maize plants, or parts thereof, produced by the method of claim 42."

The Examiner goes on to state that "...*In re Thorpe*, 227 USPQ 964, 966 (Fed. Cir. 1985), which teaches that a product-by-process claim may be properly rejectable over prior art teaching the same product by a different process, if the process of making the product fails to distinguish the two products." The Applicant points out that while the processes of breeding, cross-pollinating, growing, and self-pollinating are not unique processes, the use of the unique invention PH5HK in the processes makes the processes and the products resulting from those processes unique. The requirement of claims 14 and 43 is that PH5HK is used, thus making the processes and their resulting products unique. In light of the amendments and remarks the Applicant requests that the Examiner reconsider his rejection and allow claims 14 and 43.

Examiner rejects claims 1-49 under 35 U.S.C. 103(a) as being unpatentable over Cummings et al (U.S. 5,977,455).

In the application, the Examiner has noted some similarities in the morphologies inbred maize line PH5HK and the disclosed, but not claimed, Cummings et al. inbred maize line WQCD10: yellow endosperm, green glume, red silk, white cob and curved row direction. However, in addition to these similarities, there are also notable differences, as is documented below.

The following table notes some of the differences between inbred maize line PH5HK and the maize line WQCD10. This information can be found in Table 1 on pages 18-20 and in Tables 7 of the Cummings et al. patent, 5,977,455, in columns 18-19.

PH5HK	WQCD10
Anther color is yellow	Anther color is tan
Leaf color is dark green	Leaf color is medium green
Number of tassel branches = 13	Number of tassel branches = 6
66 cm = tassel length	34 cm = tassel length
Ear position is upright	Ear position is pendant

The Applicant respectfully disagrees with the Examiner. Applicant submits that though PH5HK and WQCD10 exhibit some similar physiological and morphological traits, PH5HK is clearly differentiated from WQCD10. One would not be able to obtain PH5HK through modification of the maize inbred taught by Cummings et al. because PH5HK comprises a unique and nonobvious combination of genetics. Further, plants

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derived from PH5HK are also clearly differentiated, and are themselves a unique and nonobvious combination of genetics derived from PH5HK. Thus, they deserve to be considered new and nonobvious compositions in their own right.

In light of the above, Applicant respectfully requests the Examiner reconsider and withdraw the rejection to claims 1-49 under 35 U.S.C. 103(a).


Cancellation of claims 33, 45, and 46 and amendment of claims 1, 3, 5, 6, 14, 16, 19, 20, 21, 22, 24, 25, 35, 37, 40, 41, 42, 43, 48, and 49 does not in any way change the claim scope which the Applicant believes is allowable but is meant to hasten the issuance of the patent.

#### CONCLUSION

Attached hereto is a marked-up version of the changes made to the specification and claims by current amendment. The attached page is captioned "**VERSION WITH MARKINGS TO SHOW CHANGES MADE**".

Applicant submits that in light of the foregoing amendments and the remarks, the claims 1-32, 34-44, and 47-49 are in condition for allowance. Reconsideration and early notice of allowability is respectfully requested. If it is felt that it would aid in prosecution, the Examiner is invited to contact the undersigned at the number indicated to discuss any outstanding issues.

Respectfully submitted,  
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**VERSION WITH MARKINGS TO SHOW CHANGES MADE****In the specification**

On page 52, lines 2-21 have been deleted and the clean paragraph as written was inserted.

**In the claims**

Claims 33, 45, and 46 were deleted.

Claims 1, 3, 5, 6, 14, 16, 19, 20, 21, 22, 24, 25, 35, 37, 40, 41, 42, 43, 48, and 49 were amended as follows:

1. (Amended) Seed of maize inbred line designated PH5HK, representative seed of said line having been deposited under ATCC Accession No. [ ] PTA-4433.

3. (Amended) The maize plant of claim 2 [, wherein said plant is male sterile] further comprising a genetic factor conferring male sterility.

5. (Amended) A tissue culture according to claim 4, [the] cells or protoplasts of the tissue culture being from a tissue selected from the group consisting of leaves, pollen, embryos, roots, root tips, anthers, silks, flowers, kernels, ears, cobs, husks, and stalks.

6. (Amended) A maize plant regenerated from the tissue culture of claim 4, capable of expressing all the morphological and physiological characteristics of inbred line PH5HK, representative seed of which have been deposited under ATCC Accession No. [ ] PTA-4433.

14. (Amended) [A] An inbred maize plant, or parts thereof, wherein [at least one ancestor of said maize plant is] said inbred maize plant was developed by a cross of the maize plant of claim 2[, said maize plant expressing a combination of at least two PH5HK traits selected from the group consisting of: a relative maturity of approximately 109 based on the Comparative Relative Maturity Rating System for harvest moisture of grain, high grain yield, strong roots, large tassel size, above average ear mold resistance, good plant health, and adapted to the Central Corn Belt region of the United States] with a second maize plant, growing a progeny seed obtained from said cross.

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and repeating the steps of selfing and growing each subsequent generation to obtain said inbred maize plant.

16. (Amended) The [maize plant breeding program] method of claim 15 wherein plant breeding techniques are selected from the group consisting of: recurrent selection, backcrossing, pedigree breeding, restriction fragment length polymorphism enhanced selection, genetic marker enhanced selection, and transformation.

19. (Amended) The single gene [conversion(s)] conversion maize plant of claim 18, wherein the gene is a dominant allele.

20. (Amended) The single gene [conversion(s)] conversion maize plant of claim 18, wherein the gene is a recessive allele.

21. (Amended) A maize plant, or parts thereof, having all the physiological and morphological characteristics of inbred line PH5HK, representative seed of said line having been deposited under ATCC accession No. [ \_\_\_\_\_ ] PTA-4433.

22. (Amended) The maize plant of claim 21 [, wherein said plant is male sterile] further comprising a genetic factor conferring male sterility.

24. (Amended) A tissue culture according to claim 23, [the] cells or protoplasts of the tissue culture being from a tissue selected from the group consisting of leaves, pollen, embryos, roots, root tips, anthers, silks, flowers, kernels, ears, cobs, husks, and stalks.

25. (Amended) A maize plant regenerated from the tissue culture of claim 23, capable of expressing all the morphological and physiological characteristics of inbred line PH5HK, representative seed of which have been deposited under ATCC Accession No. [ \_\_\_\_\_ ] PTA-4433.

35. (Amended) The [maize plant breeding program] method of claim 34 wherein plant breeding techniques are selected from the group consisting of: recurrent selection, backcrossing, pedigree breeding, restriction fragment length polymorphism enhanced selection, genetic marker enhanced selection, and transformation.

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37. (Amended) A process for producing inbred PH5HK, representative seed of which have been deposited under ATCC Accession No. [ \_\_\_\_\_ ] PTA-4433, comprising:

- (a) planting a collection of seed comprising seed of a hybrid, one of whose parents is inbred PH5HK said collection also comprising seed of said inbred;
- (b) growing plants from said collection of seed;
- (c) identifying said inbred PH5HK plants;
- (d) selecting said inbred PH5HK plant; and
- (e) controlling pollination in a manner which preserves the homozygosity of said inbred PH5HK plant.

40. (Amended) A method for producing a PH5HK-derived maize plant, comprising:

- (a) crossing inbred maize line PH5HK, representative seed of said line having been deposited under ATCC Accession No. [ \_\_\_\_\_ ] PTA-4433, with a second maize plant to yield progeny maize seed;
- (b) growing said progeny maize seed, under plant growth conditions, to yield said PH5HK-derived maize plant.

41. (Amended) A PH5HK-derived maize plant, or parts thereof, produced by the method of claim 40 [, said PH5HK-derived maize plant expressing a combination of at least two PH5HK traits selected from the group consisting of : a relative maturity of approximately 109 based on the Comparative Relative Maturity Rating System for harvest moisture of grain, high grain yield, strong roots, large tassel size, above average ear mold resistance, good plant health, and adapted to the Central Corn Belt region of the United States].

42. (Amended) The method of claim 40, further comprising:

- (c) crossing said PH5HK-derived maize plant with itself [or another maize plant] to yield additional PH5HK-derived progeny maize seed;
- (d) growing said progeny maize seed of step (c) under plant growth conditions, to yield additional PH5HK-derived maize plants;
- (e) repeating the crossing and growing steps of (c) and (d) [from 0 to 5 times] to generate further PH5HK-derived maize plants.

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43. (Amended) [A] The further [derived maize plant] PH5HK-derived maize plants, or parts thereof, produced by the method of claim 42.

48. (Amended) The single gene [conversion(s)] conversion maize plant of claim 47, wherein the gene is a dominant allele.

49. (Amended) The single gene [conversion(s)] conversion maize plant of claim 47, wherein the gene is a recessive allele.



# ATCC

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The American Type Culture Collection (ATCC) has received your deposit of seeds in connection with the filing of an application for patent. The following information is provided to fulfill Patent Office requirements.

**Name and Address of Depositor:**

Pioneer Hi-Bred International, Inc.  
Attn: Kim M. Hagemann  
7100 NW 62<sup>nd</sup> Avenue  
PO BOX 1000  
Johnston, IA 50131-1000

**Deposited on Behalf of:**

Pioneer Hi-Bred International, Inc.

**Date of Receipt of Seeds by the ATCC:**

June 4, 2002

**Scientific Description****Depositor's Reference****Patent Deposit Designation**

Inbred corn (maize) seed, Source C3CNN11097-00 RP

PH5HK 1535

PTA-4433

**The ATCC understands that:**

1. The deposit of these seeds does not grant ATCC a license, either express or implied, to infringe the patent, and our release of these seeds to others does not grant them a license, either express or implied, to infringe the patent.
2. If these seeds should die or be destroyed during the effective term of the patent, it shall be your responsibility to replace them with living seeds of the same type. It is also your responsibility to supply a sufficient quantity for distribution for the deposit term.

Prior to the issuance of a U.S. Patent, the ATCC agrees in consideration for a one-time service charge, not to distribute these seeds or any information relating thereto or to their deposit except as instructed by the depositor or relevant patent office. After a relevant patent issues, and we are instructed to release the seeds, they will be made available for distribution to the public without any restrictions.

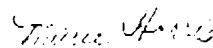
The ATCC agrees to maintain the seeds for a period of 30 years from deposit date, or 5 years after the most recent request for a sample, whichever is longer.

We will inform you of requests for the seeds for 30 years from date of deposit.

The seeds were tested June 10, 2002 and were viable

American Type Culture Collection

By



Marie Harris, Patent Specialist  
ATCC Patent Depository

Date: June 18, 2002